Morningstar Direct™ Technical Specifications and Installation Procedures

Platform Requirements
Hardware
- Intel 2nd Generation Core i3/i5/i7 (minimum)
- Intel 4th Generation Core i3/i5/i7 (recommended)

Memory
- 4GB (minimum)
- 8GB (recommended)

Disk Space
- 2 GB (minimum)

Operating Systems
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

Additional Tools/Plug-ins
- Microsoft Internet Explorer 11.0 (or higher)
- Required browsers for Direct Cloud, Asset Allocation & Portfolio Analytics: Google Chrome 48 (or higher), Mozilla Firefox 44 (or higher), Safari 5 (or higher)
- Microsoft Office 2010 (or higher)
- Adobe Reader XI (or higher)
- Microsoft Windows Installer 3.1 (minimum)
- Microsoft .NET Framework 4.6.1 (required)
- Microsoft .NET Framework 4.7 required for Morningstar Direct Excel Add-In

Internet Connection
- Dedicated T1 (1.54Mbps) or faster connection
- Internet provision to support high traffic and load determining the number.

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Morningstar Direct is an Internet-based research platform that provides timely data on a wide range of investment types, as well as the rigorous research capabilities and customized reporting options.

Architecture
Morningstar Direct uses distributed 4-tier architecture for high performance, scalability, availability and interoperability. It is architected and developed using object-oriented techniques and is highly modularized and componentized. Each class or component has its own dedicated functionality while communicating with other components through public interfaces and open standards (XML and HTTP). This enhances component reuse and reduces maintenance costs.

Investment Data
Investment data is included with the application which resides on Morningstar Direct servers and is updated continuously throughout the day. Data updates are delivered via HTTP. Frequently used data are cached on the client side to ensure speedy response times. Microsoft SQL Server 2008 is used to store all the data. Only the database administrator has access to the database for maintenance purposes only.

Security
Morningstar uses SMS patch management tool to deploy patches to all workstations and servers. Workstations patches are tested then deployed. Server patches are defined by business unit promote to production (i.e. Dev, QA, followed by production). The Web servers are load-balanced for performance, scalability and availability. It uses SSL throughout the whole site to ensure maximum security. By keeping at least 40% headroom, the application ensures its site is responsive under high traffic and maintains high redundancy and availability.

All information is encrypted and protected using industry standard, such as SSL. Morningstar uses SiteScope, Insight Manager, and MRTG for monitoring systems and automatic alerts are generated when critical systems reach specific thresholds. All workstations and servers have Symantec anti-virus software installed.

Back-up and Recovery
All our servers are hosted in a secure and access-restricted area. Database transaction logs are backed up every 30 minutes and an incremental database backup is performed every day with the full database backup done weekly. The backup tapes are stored in a secure, off-site vault. We also keep an inactive database server and other spare servers for quick recovery of service. Web and application servers are fully redundant (two servers or more) with traffic and load determining the number.

A third party nationally recognized vendor picks up tapes twice a week and delivers them to a secure storage facility. While awaiting transport they are stored inside a secure box. These tapes are created daily, weekly and monthly. They are archived in the secure facility to meet SEC requirements (six years). Destruction of data and reporting output is handled by shredding, reformatting or physical destruction. To ensure quick response, we also perform periodic testing of these disaster contingency plans.

Network Architecture
Investment data resides on Morningstar Direct servers and is updated daily. Frequently used data are cached on the client side to ensure speedy response times.
Morningstar Direct Technical Specifications and Installation Procedures

Login Information
All access to Morningstar Direct servers by an individual user is granted using a Unique Identification Code (UID) and password. UID is end-users’ email address. Requests to terminate ID’s may be made to the appropriate Morningstar personnel for employees who are transferred or terminate their employment.

The Morningstar Direct system allows for immediate ID deactivation. All unsuccessful attempts to access application resources or transactions are logged. When a user ID is first created, the Morningstar Direct system will generate a password randomly.

The application does require that passwords be different than the User ID. Passwords are encrypted and protected via SSL. Minimum length of password is six characters, which can be recycled or reused, but is not recommended. Passwords do not expire and users can change their passwords at any time, if they are verified. Password characters are hidden, when logging in and when changing passwords within the application. The Morningstar Direct system will time out an inactive user session after two hours of inactivity. Concurrent logons to the same sessions are prohibited.

Morningstar Direct Technical Specifications and Installation Procedures

Desktop (Client) Install
By default, the setup program creates a Morningstar folder under the C:\Program Files directory. The program files include:
- Prerequisite files
  - Morningstar Direct related font files
  - Adobe Flash Player version 10.0
  - Silverlight version 5.1
- Main executable modules
- Main update module
- Presentation Studio
- Microsoft .NET Framework 4.6.1

System Files Updated
Morningstar Direct will update the following system files if they are missing or the ones on the target system have lower version numbers.

<table>
<thead>
<tr>
<th>File Name</th>
<th>Version</th>
<th>OS Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFC80U.DLL</td>
<td>7.10.3077.0</td>
<td>All OS</td>
</tr>
<tr>
<td>MSVCP100.DLL</td>
<td>7.10.3077.0</td>
<td>All OS</td>
</tr>
<tr>
<td>MSVCP110.DLL</td>
<td>7.10.3052.4</td>
<td>All OS</td>
</tr>
<tr>
<td>MSVCR80.DLL</td>
<td>8.0.50727.42</td>
<td>All OS</td>
</tr>
<tr>
<td>MSVCR90.DLL</td>
<td>8.0.50727.42</td>
<td>All OS</td>
</tr>
<tr>
<td>FinClipb21.dll</td>
<td>All OS</td>
<td></td>
</tr>
</tbody>
</table>

If filter traffic via IP address, please open Firewall/Proxy for the following blocks of IP Addresses:
- 216.228.225.0/255
- 216.228.224.0/255
- 216.228.237.0/255
- 216.228.236.0/255

Firewall/Proxy Server Configuration (exceptions)
If filter traffic via IP address, please open Firewall/Proxy for the following IP Addresses:
- 216.228.224.0/255
- 216.228.225.0/255
- 216.228.236.0/255
- 216.228.237.0/255

Note: IP addresses for URLs hosted on Amazon CloudFront/CDN are not listed above because these will change constantly.

Morningstar Direct Technical Specifications and Installation Procedures

Morningstar Direct uses Windows Installer to install necessary files and set up environment. We require that Windows Installer 3.1 (minimum) be installed before Morningstar Direct is installed. There are two methods via which a user can install Morningstar Direct.

1. Install with Morningstar Direct’s installation driver.
   This is the recommended installation method.
   Go to https://gladmainnew.morningstar.com/dwsv2/direct/morningstardirectsetup.exe and follow the instructions. The InstallShield Wizard will examine the user’s machine, warn the user if Morningstar Direct cannot be installed on the target machine, and install necessary files accordingly. The InstallShield Wizard will also download additional installation files from Morningstar to complete the installation.

2. Directly install prerequisites and MSI packages.
   If you choose to install the MSI package directly, please make sure have InstallShield Script Engine 8 installed in the machine. InstallShield Script Engine 8 can be downloaded from http://adminnew.morningstar.com/dwsv2/tools/isscript8.msi

Next, go to https://gladmainnew.morningstar.com/dwsv2/direct/prerequisite.msi to download prerequisites.

Then install full installation package through link:
http://gladmainnew.morningstar.com/dwsv2/direct/05/direct.msi

Morningstar Excel Add-In Install
This requires a separate installation. Go to Morningstar Direct to access installation link or go to http://addin.morningstarcommodity.com/

Network/Citrix Install
Contact Morningstar for Server/Client configurations.

Citrix Environment
Although we do not foresee any difficulties having Morningstar Direct installed in a Citrix environment, it has not yet been fully tested under this environment.

Partner's Technical Specifications and Integration Procedures

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